

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

To: _____

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No. PCT/JP2010/061300	International filing date (day/month/year) 25.06.2010	Priority date (day/month/year) 21.05.2010
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International Patent Classification (IPC) or both national classification and IPC
INV. G02B27/28 G03F7/20

Applicant
NIKON CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application



2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

<p>Name and mailing address of the ISA:</p>  <p>European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465</p>	<p>Date of completion of this opinion</p> <p>see form PCT/ISA/210</p>	<p>Authorized Officer</p> <p>P Theopistou-Bertram</p> <p>Telephone No. +49 89 2399-2471</p> 
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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2010/061300

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
 - a. (means)
 - ☐ on paper
 - ☐ in electronic form
 - b. (time)
 - ☐ in the international application as filed
 - ☐ together with the international application in electronic form
 - ☐ subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	<u>1-36</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-36</u>
Industrial applicability (IA)	Yes: Claims	<u>1-36</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V.

1 Reference is made to the following documents:

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- D1 EP 1 681 710 A1 (NIPPON KOGAKU KK [JP]) 19 July 2006 (2006-07-19)
- D2 EP 1 953 805 A1 (NIPPON KOGAKU KK [JP]) 6 August 2008
(2008-08-06)
- D3 WO 2005/069081 A2 (ZEISS CARL SMT AG [DE]; FIOKA DAMIAN
[DE]; DEGUENTHER MARKUS [DE]) 28 July 2005 (2005-07-28)
- D4 EP 1 840 945 A1 (NIPPON KOGAKU KK [JP]) 3 October 2007
(2007-10-03)
- D5 US 2006/170901 A1 (TANITSU OSAMU [JP] ET AL) 3 August 2006
(2006-08-03)

2 ARTICLE 6 PCT

2.1 The application does not fulfil the requirements of Article 6 PCT for the following reasons:

2.2 Although claims 1 and 18 have been drafted as separate apparatus independent claims, they appear to relate effectively to similar subject-matter and to differ from each other with regard to the definition of the subject-matter for which protection is sought. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT. Claim 18 can be deleted.

2.3 Claims 11 and 29 refer to an illumination system and an illumination pupil without the system or the pupil being features of the claim. Claims 14 and 33 refer to a projection optical system however the system is not part of the illumination system. The intended limitations are therefore not clear from these claims, contrary to the requirements of Article 6 PCT.

2.4 It is clear from the description (see Fig. 5-8, 11-15 and par. [0080]-[0087], par. [0092], [0096]) that the following features are essential to the definition of the invention:

(1) the plurality of first regions of the first optical element and the plurality of the second regions of the second optical element are arrayed so as to surround the optical axis along a circumferential direction around the optical axis on a plane perpendicular to the optical axis

(2) the plurality of first regions of the first optical element and the plurality of second regions of the second optical element are regions obtained by equally dividing the optical material of a circular or annular shape along the circumferential direction of the optical material.

Since independent claim 1 does not contain these feature it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

2.5 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

3 INDEPENDENT CLAIM 1

3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new and not inventive in the sense of Articles 33(2) and 33(3) PCT.

3.2 Document D1 (paragraph [0032] - paragraph [0061]; figures 1-4) discloses (the references in parentheses applying to this document):

A polarization converting unit (Fig. 1, 2, 3) arranged on an optical axis of an optical system, for converting a polarization state of propagation light passing along an optical-axis direction corresponding to the optical axis, the polarization converting unit comprising:

- a first optical element (12) comprised of an optical material with an optical rotatory power, which is arranged so as to have a crystal axis coincident or parallel with the optical-axis direction, the first optical element having a plurality of first regions with respective polarization conversion properties to rotate linearly polarized light incident thereto as the propagation light, around the optical-axis direction (par. [0043]-[0055]); and

- a second optical element (13) comprised of an optical material with an optical rotatory power, which is arranged on the exit side of the first optical element and which is arranged so as to have a crystal axis coincident or parallel with the optical-axis direction, the second optical element having a

plurality of second regions with respective polarization conversion properties to rotate linearly polarized light incident thereto as the propagation light, around the optical-axis direction (par. [0056]-[0060]),

wherein at least two first regions selected from the plurality of first regions have their respective thicknesses different from each other in the optical-axis direction, and wherein the plurality of first regions are arranged so that two first regions with mutually different polarization conversion properties are adjacent to each other,

wherein at least two second regions selected from the plurality of second regions have their respective thicknesses different from each other in the optical-axis direction, and wherein the plurality of second regions are arranged so that two second regions with mutually different polarization conversion properties are adjacent to each other, and

wherein the first and second optical elements are arranged so that a light beam having passed through one first region of the first optical element is incident to two adjacent second regions of the second optical element, whereby the sum of respective thicknesses in the optical-axis direction of first and second regions through which a first reference axis parallel to the optical-axis direction passes is different from the sum of respective thicknesses in the optical-axis direction of other first and second regions through which a second reference axis parallel to the optical-axis direction and different from the first reference axis passes.

Therefore, the subject-matter of claim 1 is not new and not inventive (Article 33(2) and 33(3) PCT).

- 3.3 It is noted that documents D2 (paragraph [0109] - paragraph [0146]; figures 16-21) and D3 (page 33, line 26 - page 34, line 24; figure 6) also anticipate the subject-matter of claim 1 (Articles 33(2) and 33(3) PCT)

4 INDEPENDENT CLAIM 18

- 4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 18 is not new and not inventive in the sense of Articles 33(2) and 33(3) PCT.
- 4.2 Claim 18 has the same features as claim 1. Hence, the same argumentation as for claim 1 applies.

5 DEPENDENT CLAIMS 2-17, 19-36

5.1 Dependent claims 2-17, 19-36 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step because they concern known or standard structural aspects of polarisation converting elements, illumination and exposure apparatus as also disclosed by D1-D5 (see also the citations of the International Search Report) (Article 33(2) and (3) PCT):

- claims 2-10, 19-30 see D2 or D3 or D5
- claims 11-17, 31-36 see any of D1-D5.

Possible steps after receipt of the international search report (ISR) and written opinion of the International Searching Authority (WO-ISA)

General information	For all international applications filed on or after 01/01/2004 the competent ISA will establish an ISR. It is accompanied by the WO-ISA. Unlike the former written opinion of the IPEA (Rule 66.2 PCT), the WO-ISA is not meant to be responded to, but to be taken into consideration for further procedural steps. This document explains about the possibilities.
Amending claims under Art. 19 PCT	Within 2 months after the date of mailing of the ISR and the WO-ISA the applicant may file amended claims under Art. 19 PCT directly with the International Bureau of WIPO. The PCT reform of 2004 did not change this procedure. For further information please see Rule 46 PCT as well as form PCT/ISA/220 and the corresponding Notes to form PCT/ISA/220.
Filing a demand for international preliminary examination	<p>In principle, the WO-ISA will be considered as the written opinion of the IPEA. This should, in many cases, make it unnecessary to file a demand for international preliminary examination. If the applicant nevertheless wishes to file a demand this must be done before expiry of 3 months after the date of mailing of the ISR/ WO-ISA or 22 months after priority date, whichever expires later (Rule 54bis PCT). Amendments under Art. 34 PCT can be filed with the IPEA as before, normally at the same time as filing the demand (Rule 66.1 (b) PCT).</p> <p>If a demand for international preliminary examination is filed and no comments/amendments have been received the WO-ISA will be transformed by the IPEA into an IPRP (International Preliminary Report on Patentability) which would merely reflect the content of the WO-ISA. The demand can still be withdrawn (Art. 37 PCT).</p>
Filing informal comments	After receipt of the ISR/WO-ISA the applicant may file informal comments on the WO-ISA directly with the International Bureau of WIPO. These will be communicated to the designated Offices together with the IPRP (International Preliminary Report on Patentability) at 30 months from the priority date. Please also refer to the next box.
End of the international phase	At the end of the international phase the International Bureau of WIPO will transform the WO-ISA or, if a demand was filed, the written opinion of the IPEA into the IPRP, which will then be transmitted together with possible informal comments to the designated Offices. The IPRP replaces the former IPEA (international preliminary examination report).
Relevant PCT Rules and more information	Rule 43 PCT, Rule 43bis PCT, Rule 44 PCT, Rule 44bis PCT, PCT Newsletter 12/2003, OJ 11/2003, OJ 12/2003